

REMARKS

Please note that the correspondence address the PTO is using for the present application is incorrect. PTO Communications should be mailed to FLYNN, THIEL, BOUTELL & TANIS, P.C., 2026 Rambling Road, Kalamazoo, MI 49008-1631 as shown on the enclosed copy of the Declaration for the present application. TARR and the Office Actions show the correspondence address as being "NOVARTIS", which is incorrect.

In order to expedite the prosecution of the present application, Claim 5 has been amended to state that the 3-chloro-5-nitrotoluene is reduced by a reducing agent. This amendment has been made in response to the Examiner's rejection of Claim 5 under 35 USC 112. The Examiner is informed that the Applicant is not required to recite specific reducing agents and conditions under which reduction takes place as this is not the essence of the present invention and could be readily determined by one of ordinary skill in the art. Nothing in the present specification suggests that the reduction of 3-chloro-5-nitrotoluene is carried out using a critical reducing agent and under critical reducing conditions. As such, Applicants respectfully submit that the rejection of Claim 5 under 35 USC 112 clearly is in error.

Newly presented Claim 6 limits Claim 5 in requiring that the reducing agent is selected from the group consisting of tin chloride and Raney nickel. Support for this amendment can be filed in the first full paragraph on page 4 of the clean copy of the substitute specification. No new matter has been added.

Claims 1-4 have been rejected under 35 USC 103(a) as being unpatentable over Grella et al in view of Metzger. Applicant respectfully traverses this ground of rejection and urges reconsideration in light of the following comments.

As stated previously, the instant invention is directed to a process for preparing 3-chloro-5-nitrotoluene which requires the steps of reacting 2-methyl-4-nitroaniline with

t-butylhypochlorite in a neutral condition to obtain 2-chloro-4-nitro-6-methylaniline and deaminating a reactant mixture containing the 2-chloro-4-nitro-6-methylaniline to obtain 3-chloro-5-nitrotoluene. The process of the present invention enables the production of 3-chloro-5-nitrotoluene and the subsequent production of 3-chloro-5-methylphenylisocyanate in a large amount without any subsequent purification being needed and the 3-chloro-5-nitrotoluene is prepared under mild conditions, without a strong acid or strong base being necessary. With the present invention, a purification step is not necessary since the produced product has such a high purity. It is respectfully submitted that the presently claimed invention clearly is patentably distinguishable over the prior art cited by the Examiner.

The Grella et al reference discloses a process for preparing 3-chloro-5-nitrotoluene which comprises the steps of mixing 4-methyl-2-nitroaniline and N-chlorosuccinimide and acetonitrile to produce 2-chloro-4-methyl-6-nitroaniline which is cooled to 0°C and then mixed with concentrated sulfuric acid and sodium nitrite and the reaction mixture allowed to warm to room temperature. The mixture is then refluxed until the evolution of nitrogen gas is ceased. The reaction mixture is then concentrated under a reduced pressure, diluted with water and extracted with ethyl acetate. The combined organic fractions were then washed with brine, dried over anhydrous magnesium sulfate and the solvent removed under reduced pressure to provide 3-chloro-5-nitrotoluene. The product was then purified by flash chromatography to give an orange solid of a 69% purity.

As admitted by the Examiner, the Grella et al reference has no disclosure with respect to using t-butylhypochlorite as a chlorinating agent for the 2-methyl-4-nitroaniline or the reaction mixture being maintained at a temperature of from 40-50°C during the deamination step. To supply these missing teachings, the Examiner has cited the Metzger et al reference.

The Metzger et al reference discloses a process for preparing a chlorinated diisocyanate, which is preferably carried out under substantially anhydrous conditions, involving the steps of adding a halogenation agent to 2,4- and/or 2,6-toluene diamine, which has preferably been dissolved in an inert organic solvent, at a temperature of from 10-90°C. As a halogenating agent, N-chlorosuccinimide and t-butylhypochlorite are disclosed as being used.

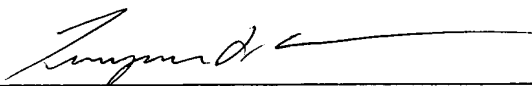
Example 1 of Metzger et al exemplifies the process disclosed there in that N-chlorosuccinimide is reacted with 2,4-toluene diamine to produce 2.4 grams of the product, which results in a yield of about 13%. The Examiner states in the Office Action that the Metzger et al reference provides the motivation to use t-butylhypochlorite as an alternative to the N-chlorosuccinimide chlorinating agent in the Grella et al process since Metzger et al discloses that N-chlorosuccinimide and t-butylhypochlorite are equivalent chlorinating agents of aromatic compounds having methyl and amino substituents. However, as explained previously, in the present invention, N-chlorosuccinimide and t-butylhypochlorite are not equivalent. When N-chlorosuccinimide is used, succinimide is produced as a side-product and cannot be separated out by filtration due to its low solubility. As such, further purification by crystallization or chromatography is needed. In contrast thereto, by the process of the present invention using t-butylhypochlorite, side-products can be completely removed by just filtration which enables the product to be produced in a high purity. The Table below compares the process of the present invention with that of Grella et al and Metzger et al.

		Grella et al	The invention	Metzger
In the 1 st step of chlorination	Chlorinating agent	N- chlorosuccinimic imide	t- butylhypochlorite	N- chlorosuccinimic imide
	Purification	By chromatography	Unnecessary	Filtrated and re-crystallized
	Production yield	29%	80%	13%
In the 2 nd step of deamination	Reaction temperature	Room temperature	40 to 50°C	-
	Purification	By chromatography	Unnecessary	-
	Production yield	69%	90%	-

The data in the above Table is prepared from Examples 1 and 2 of the present application, the data for Grella et al is prepared from page 4733, right hand column, lines 19-44, and the data from Metzger et al is cited from Example 1.

As can be seen from the above Table, the production yield of the product of the present invention after deamination is $80\% \times 90\% = 72\%$. In contrast thereto, the production yield after the deamination step of Grella et al is $29\% \times 69\% = 20\%$. That is, the present invention has a production yield of 52% higher than that of Grella et al. As such, t-butylhypochlorite and N-chlorosuccinimide are not equivalent in the presently claimed invention. It is respectfully submitted that the unobviousness of the presently claimed invention has been established over the references cited by the Examiner. The Examiner is respectfully requested to reconsider the present application and to pass it to issue.

Respectfully submitted,

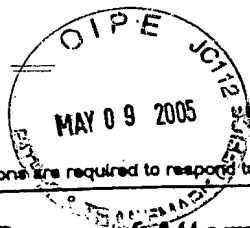

 Terryence F. Chapman

TFC/smd

FLYNN, THIEL, BOUTELL	Dale H. Thiel	Reg. No. 24 323
& TANIS, P.C.	David G. Boutell	Reg. No. 25 072
2026 Rambling Road	Ronald J. Tanis	Reg. No. 22 724
Kalamazoo, MI 49008-1631	Terryence F. Chapman	Reg. No. 32 549
Phone: (269) 381-1156	Mark L. Maki	Reg. No. 36 589
Fax: (269) 381-5465	Liane L. Churney	Reg. No. 40 694
	Brian R. Tumm	Reg. No. 36 328
	Steven R. Thiel	Reg. No. 53 685
	Donald J. Wallace	Reg. No. 43 977
	Sidney B. Williams, Jr.	Reg. No. 24 949

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Japanese Language Declaration

日本語宣言書

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As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PROCESS FOR PREPARING 3-CHLORO-

5-NITROTOLUENE

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

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I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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Prior Foreign Application(s)

外国での先行出願

2003-018299

(Number)
(番号)

Japan

(Country)
(国名)

28 January 2003

(Day/Month/Year Filed)
(出願年月日)

Priority Not Claimed

優先権主張なし

☐

(Number)
(番号)

(Country)
(国名)

(Day/Month/Year Filed)
(出願年月日)

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Dale H. Thiel, Reg. No. 24 323
David G. Boutell, Reg. No. 25 072
Ronald J. Tanis, Reg. No. 22 724
Terryence F. Chapman, Reg. No. 32 549
Mark L. Maki, Reg. NO. 36 589

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)

David S. Goldenberg, Reg. No. 31 257
Sidney B. Williams, Jr., Reg. No. 24 949
Timothy B. Clise, Reg. No. 40 957
Liane L. Churney, Reg. No. 40 694
Brian R. Tumm, Reg. No. 36 328

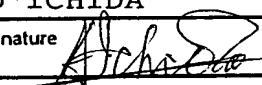
書類送付先

Send Correspondence to:

FLYNN, THIEL, BOUTELL & TANIS, P.C.
2026 Rambling Road
Kalamazoo, Michigan 49008-1699

直接電話連絡先: (名前及び電話番号)

Direct Telephone Calls to: (name and telephone number)

唯一または第一発明者名	Full name of sole or first inventor	
	Akito ICHIDA	
発明者の署名	日付	Inventor's signature Date
		 Nov. 21, 2003
住所	Residence	
	Aomori, Japan	
国籍	Citizenship	
	Japan	
私書箱	Post Office Address	
	5-8-5, Honcho, Aomori-shi,	
	Aomori 030-0802, Japan	
第二共同発明者	Full name of second joint inventor, if any	
第二共同発明者	日付	Second inventor's signature Date
住所	Residence	
国籍	Citizenship	
私書箱	Post Office Address	

(第三以降の共同発明者についても同様に記載し、署名をすること)

(Supply similar information and signature for third and subsequent joint inventors.)